

## **ESTIMATING WATER, WASTEWATER & IRRIGATION PLANT INVESTMENT FEES AND DETERMINING WATER METER SIZING**

**Water and Wastewater Plant Investment Fees (PIFs) are charged when an increase in demand is placed on the City's existing water and wastewater systems.**

### **ESTIMATING WATER AND WASTEWATER PIFs FOR RESIDENTIAL AND NON-RESIDENTIAL USES**

**1. Determine the total number of water and wastewater fixture units for the project by completing the Plumbing Fixture Unit Calculation Worksheet (page 3):**

- Completely fill out columns A, B, C, D, G, and H. Be sure to include all fixtures served by the water meter. For example, if you are remodeling a tenant space, it is likely that all fixtures in the entire core and shell building are served from the same meter.
- Sum the water fixture units and write the total in the space for TOTAL FIXTURE UNITS at the bottom of column G.
- Sum the wastewater fixture units and write the total in the space for TOTAL FIXTURE UNITS at the bottom of column H.

**2. Estimate the gallons per minute (gpm) demand created by the project:**

- Go to the Fixture Unit/G.P.M. Demand Chart (page 5) and find the gpm demand that corresponds to the total number of water fixture units calculated in step 1.
- Go to the Fixture Unit/G.P.M. Demand Chart and find the gpm demand that corresponds to the total number of wastewater fixture units calculated in step 1.

**3. Determine the water meter size required for the project:**

- After calculating the total water gpm demand, refer to the small Residential / Non-residential Meter Sizing chart (see bottom of page 5) and determine the meter size required for the project. The chart shows the demand range allowed for each meter size.
- For additions, remodels and new construction on lots previously served by city water, determine the existing meter size. Contact Utility Billing (303-441-3260) for assistance.
- For additions, remodels and new construction requiring new meter installation, refer to the Right-of-Way Permits and Utility Fees sections of the Schedule of Fees to determine meter and tap fees. Please note: these fees do not include excavation costs. In addition, refunds will not be given for existing meters and taps. All work in the City Right-of-Way (ROW), must be completed by a ROW licensed contractor.

**4. Determine the Plant Investment Fees (PIFs) that will be assessed to the project:**

- Refer to pages concerning Plant Investment Fees in the Utility Fees section of the Schedule of Fees. Residential PIFs are determined by the number of toilets, including rough-ins. (See pages 7-8 for examples.)
- An existing meter is given a PIF credit based on the existing plumbing fixtures. PIF credit is determined from these existing plumbing fixtures and subtracted from the total PIF owed. Please note: in order to receive credit, the plumbing fixtures must have been permitted for previously. Credit will be given in PIF form only, not as a cash refund. To calculate PIF credit for an existing structure, complete the Plumbing Fixture Unit Calculation Worksheet - Credit (page 4) using the same methodology as steps 1 & 2 of these instructions and the current rates in the Schedule of Fees.

## **ESTIMATING WATER AND WASTEWATER PIFs FOR MIXED USE**

1. **Separately determine the total number of water and wastewater fixture units for both residential and non-residential fixtures for the project (see above).**
2. **Sum the residential and non-residential fixture units together before converting the total number of fixture units to the corresponding gpm demand (see above).**
3. **Determine the water meter size required for the project (see above) using the combined gpm demand.**
4. **Determine the Plant Investment Fees (PIFs) that will be assessed to your project:**
  - Separately calculate the residential and non-residential PIFs (see above).
  - Combine the residential and non-residential PIFs to determine the total water and wastewater PIF.

## **ESTIMATING IRRIGATION PIF FOR MULTI-FAMILY RESIDENTIAL AND NON-RESIDENTIAL USES**

1. Per section 5.09(C) of the Boulder Design and Construction Standards, all irrigation services shall have a separate service line and meter, with the exception of single-family residential properties. If the project is multi-family, non-residential or mixed use and has a separate irrigation meter, a separate irrigation PIF will be assessed.
2. At or before the time of ROW permit, a letter must be submitted that is printed on the landscape architect or irrigation company's letterhead, signed by the landscape architect/irrigation company and that states the gpm demand of the largest irrigated zone. This "gallons per minute (gpm) demand letter" is required to calculate the irrigation PIF.
3. Refer to the Utility Fees section of the Schedule of Fees to determine the irrigation PIF. Multiply the gpm demand of the largest irrigated zone by the dollar amount given in the Schedule of Fees. (See page 8 for example.)
4. The irrigation meter, permit and inspection fees will be assessed at the time of ROW permit in addition to the irrigation PIF.



City of Boulder Planning and Development Services Center  
**PLUMBING FIXTURE UNIT CALCULATION WORKSHEET**  
 For applicant use only.\*

TYPE OF FIXTURE	NUMBER OF EXISTING FIXTURES	NUMBER OF FIXTURES TO BE REMOVED	NUMBER OF NEW FIXTURES	TOTAL NUMBER OF PLUMBING FIXTURES (A-B+C)	RESIDENTIAL FIXTURE UNITS	NON-RESIDENTIAL FIXTURE UNITS	TOTAL WATER FIXTURE UNITS (Res. = D x E) (Non-Res. = D x F)	TOTAL WASTE-WATER FIXTURE UNITS (Res. = D x E) (Non-Res. = D x F)
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
<b>RESIDENTIAL OR NON-RESIDENTIAL</b>								
Tank Toilet					3	5		
Bathtub / Bathtub Shower Combo					2	4		
Shower Stall (per head)					2	4		
Sink (Bath, Hand, Bar, Lab)					1	2		
Sink (Kitchen/Compartment)					2	4		
Dishwasher					2	4		
Ice Machine, 3/8" line size					1	2		
Washer / Laundry Tub / Utility Sink					2	4		
Hose Bibb / Sill Cock					3	5		
Floor Drain / Floor Sink					2	2		
Sand Trap, Interceptor					2	6		
<b>NON-RESIDENTIAL</b>								
Flush Valve Toilet						8		
Urinal						5		
Industrial Dishwasher						6		
Beverage Hook-up						1		
Drinking Fountain						1		
Sink (Service / Mop / Janitor)						4		
Emergency Eye Wash						1		
Emergency Shower						2		
Dip Well						1		
Grease Trap, Interceptor						3		
Industrial Clotheswasher						6		
Ice Machine, 3/8" line size						2		
Ice Machine, 1/2" line size						4		
Ice Machine, 3/4" line size						6		
Ice Machine, 1" line size						10		
					<b>TOTAL FIXTURE UNITS (sum column)</b>			
					<b>TOTAL GPM DEMAND (see chart - page 5)</b>			
					<b>REQUIRED METER SIZE (see chart - page 5)</b>			
					<b>TOTAL PIF OWED (see Schedule of Fees)</b>			

\* THIS WORKSHEET IS FOR APPLICANT USE ONLY. DO NOT SUBMIT THIS FORM AT THE TIME OF BUILDING PERMIT. A SEPARATE PLUMBING FIXTURE COUNT FORM WILL BE REQUIRED TO BE SUBMITTED.



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## PLUMBING FIXTURE UNIT CALCULATION WORKSHEET – CREDIT

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Use this worksheet to calculate water and wastewater PIF credit when the project includes an existing structure and water meter. Please note: in order to receive credit, the plumbing fixtures must have been permitted for previously.

TYPE OF FIXTURE	NUMBER OF EXISTING FIXTURES	RESIDENTIAL FIXTURE UNITS	NON-RESIDENTIAL FIXTURE UNITS	TOTAL WATER FIXTURE UNITS Res. = A x B Non-Res. = A x C	TOTAL WASTE-WATER FIXTURE UNITS Res. = A x B Non-Res. = A x C
RESIDENTIAL OR NON-RESIDENTIAL	(A)	(B)	(C)	(D)	(E)
Tank Toilet		3	5		
Bathtub / Bathtub Shower Combo		2	4		
Shower Stall (per head)		2	4		
Sink (Bath, Hand, Bar, Lab)		1	2		
Sink (Kitchen/Compartment)		2	4		
Dishwasher		2	4		
Ice Machine, 3/8" line size		1	2		
Washer / Laundry Tub / Utility Sink		2	4		
Hose Bibb / Sill Cock		3	5		
Floor Drain / Floor Sink		2	2		
Sand Trap, Interceptor		2	6		
<b>NON-RESIDENTIAL</b>					
Flush Valve Toilet			8		
Urinal			5		
Industrial Dishwasher			6		
Beverage Hook-up			1		
Drinking Fountain			1		
Sink (Service / Mop / Janitor)			4		
Emergency Eye Wash			1		
Emergency Shower			2		
Dip Well			1		
Grease Trap, Interceptor			3		
Industrial Clotheswasher			6		
Ice Machine, 3/8" line size			2		
Ice Machine, 1/2" line size			4		
Ice Machine, 3/4" line size			6		
Ice Machine, 1" line size			10		
TOTAL FIXTURE UNITS CREDIT (sum column)					
TOTAL GPM DEMAND CREDIT (see chart – page 5)					
EXISTING WATER METER SIZE (call 303-441-3260)					
TOTAL PIF CREDIT (see Schedule of Fees)					
TOTAL PIF OWED (see page 3)					
SUBTRACT TOTAL PIF CREDIT (see above)					
TOTAL PIF DUE (PIF OWED – PIF CREDIT)					

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DO NOT SUBMIT THIS FORM AT THE TIME OF BUILDING PERMIT.  
A SEPARATE PLUMBING FIXTURE COUNT FORM WILL BE REQUIRED TO BE SUBMITTED.

**FIXTURE UNIT / GPM DEMAND CHART  
(WATER AND WASTEWATER)**

F.U.	G.P.M.	F.U.	G.P.M.	F.U.	G.P.M.	F.U.	G.P.M.	F.U.	G.P.M.
1	0	57	32	113	47	169	59	225	70
2	0	58	33	114	47	170	59	226	70
3	0	59	33	115	47	171	60	227	70
4	0	60	33	116	48	172	60	228	70
5	0	61	33	117	48	173	60	229	70
6	0	62	34	118	48	174	60	230	70
7	5	63	34	119	48	175	60	231	70
8	6	64	35	120	49	176	60	232	70
9	8	65	35	121	49	177	60	233	71
10	8	66	35	122	49	178	61	234	71
11	9	67	35	123	49	179	61	235	71
12	10	68	36	124	49	180	61	236	71
13	10	69	36	125	50	181	61	237	72
14	11	70	36	126	50	182	62	238	72
15	11	71	36	127	50	183	62	239	72
16	12	72	37	128	50	184	62	240	72
17	13	73	37	129	50	185	62	241	73
18	13	74	37	130	50	186	62	242	73
19	14	75	37	131	50	187	62	243	73
20	14	76	37	132	51	188	62	244	73
21	15	77	38	133	51	189	62	245	74
22	15	78	38	134	51	190	62	246	74
23	16	79	38	135	52	191	62	247	74
24	17	80	38	136	52	192	62	248	74
25	17	81	39	137	52	193	64	249	74
26	18	82	39	138	52	194	64	250	74
27	19	83	39	139	53	195	64	251	75
28	19	84	39	140	53	196	64	252	75
29	19	85	40	141	53	197	64	253	75
30	20	86	40	142	53	198	64	254	75
31	20	87	40	143	53	199	64	255	75
32	20	88	41	144	54	200	65	256	76
33	21	89	41	145	54	201	65	257	76
34	22	90	41	146	54	202	65	258	76
35	22	91	41	147	54	203	65	259	76
36	23	92	42	148	55	204	66	260	77
37	23	93	42	149	55	205	66	261	77
38	24	94	43	150	55	206	66	262	77
39	24	95	43	151	55	207	66	263	77
40	25	96	43	152	55	208	66	264	77
41	25	97	43	153	55	209	67	265	78
42	25	98	43	154	56	210	67	266	78
43	26	99	43	155	56	211	67	267	78
44	26	100	44	156	57	212	67	268	78
45	27	101	44	157	57	213	67	269	78
46	27	102	44	158	57	214	68	270	79
47	27	103	44	159	57	215	68	271	79
48	28	104	45	160	57	216	68	272	79
49	28	105	45	161	58	217	68	273	79
50	28	106	45	162	58	218	68	274	80
51	29	107	45	163	58	219	68	275	80
52	30	108	46	164	58	220	69	276	80
53	30	109	46	165	58	221	69	277	80
54	30	110	46	166	59	222	69	278*	80
55	31	111	46	167	59	223	69		
56	31	112	47	168	59	224	69		

**Residential / Non-residential  
Water Meter Sizing**

Meter Size	GPM
3/4"	1-24
1"	25-40
1-1/2"	41-80
2"	81-128
3"	129-240
4"	241-400
6"	401-800

\* For fixture units greater than 278, please see the attached demand equations (page 8).

## **DEMAND EQUATIONS: CONVERTING FIXTURE UNITS TO GPM**

**(Use these equations to determine gpm demand only  
when total fixture units are greater than 278.)**

### **Demand Equation for Predominately Flush Valves:**

For fixture unit counts of 9 or less, GPM is given to be zero.

For fixture units between 10 and 999, use the following equation (Fixture units = A):

$$\text{GPM} = (0.000006 \times A^3) - (0.0029 \times A^2) + (0.664 \times A) + 1.349$$

For fixture units = 1000 or greater, use the following equation (Fixture units = A):

$$\text{GPM} = (0.000000008 \times A^3) - (0.00006 \times A^2) + (0.2424 \times A) + 17.451$$

### **Demand Equation for Predominately Flush Tanks:**

For fixture unit counts of 7 or less, GPM is given to be zero.

For fixture units between 8 and 224, use the following equation (Fixture units = A):

$$\text{GPM} = (0.000006 \times A^3) - (0.0029 \times A^2) + (0.664 \times A) + 1.349$$

For fixture units = 225 or greater, use the following equation (Fixture units = A):

$$\text{GPM} = (0.000000008 \times A^3) - (0.00006 \times A^2) + (0.2424 \times A) + 17.451$$

## WATER, WASTEWATER & IRRIGATION PIF ESTIMATION EXAMPLES

### SINGLE-FAMILY RESIDENTIAL

You have an existing detached single-family residential home with 4 bathrooms. You have calculated an existing total water demand of 21 gpm and have determined that your current water meter size is 3/4".

You are *credited* with having a large size residence (more than 3 bathrooms) with less than 24 gpm. At current rates, the water PIF is equal to \$11,435.

You would like to add additional plumbing fixtures in the house and have calculated the total demand to equal **27** gpm. You determine that this additional demand will require the existing 3/4" water meter to be upsized to 1".

You are *charged* for a large size unit (more than 3 bathrooms) with 25 gpm or more. At current rates, the water PIF is equal to:  $\$9,530 + [\$530 \times (27 - 18)] = \$14,300$ .

Subtracting your credit from the total amount owed, the water PIF due is:  
 $(\$14,300 - \$11,435) = \$2,865$ .

The wastewater PIF and credit can be calculated using the wastewater rates and the same methodology.

### MULTI-FAMILY RESIDENTIAL

You have an existing condo unit (Attached Multi-Family Residential) with two bathrooms. You have calculated an existing total water demand of less than 18 gpm. You would like to add a third bathroom and you have calculated the total water demand to remain less than 18 gpm.

You are *credited* with having an average size unit (2 bathrooms). At current rates, the water PIF is equal to \$7,625.

You are *charged* for a large size unit (3 bathrooms). At current rates, the water PIF is equal to \$9,530.

Subtracting your credit from the total amount owed, the water PIF due is:  
 $(\$9,530 - \$7,625) = \$1,905$

## NON-RESIDENTIAL

You have an existing commercial use building. You have calculated a total existing water demand of **39** gpm and have determined that the current water meter size is 1".

At current rates, you are *credited* with a water PIF of:  $\$9,530 + [\$530 \times (39-18)] = \$20,660$ .

You would like to add additional plumbing fixtures in the building and have calculated that the existing and proposed fixtures will increase the total water demand to **45** gpm. You determine this additional demand will require the existing 1" water meter to be upsized to 1-1/2".

At current rates, you are *charged* a water PIF of:  $\$9,530 + [\$530 \times (45-18)] = \$23,840$ .

Subtracting your credit from the total amount owed, the water PIF due is:  
 $(\$23,840 - \$20,660) = \$3,180$ .

The wastewater PIF and credit can be calculated using the wastewater rates and the same methodology.

## IRRIGATION

You would like to build a new mixed-use building and it will require an irrigation meter. The landscape plan shows the meter supplying 3 landscape zones. The demands are 10 gpm, 12 gpm and 15 gpm for each zone, respectively.

The irrigation PIF is \$635 for each gpm of the largest irrigated zone.

Your largest irrigated zone is **15** gpm. Therefore, the irrigation PIF due is:  
 $\$635 \times 15 = \$9,525$ .

The landscape architect or irrigation designer can supply the needed gpm demand information.